



A Systematic Review of Lifestyle Modification Interventions for the Management of Diabetes Among Adults in the UK

MSc Public Health and Social Care in Practice

Module: Practice-Based Research (LCHS7008)

Component 2: Written Research Proposal

Student Name: MD Shamim Osman

Student Number: 2503961

Lecturer/Supervisor: Caroline Salami

Word Count: 2636

Submission Date: 18 August 2026

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1. Title of the Proposed Research

A systematic review of lifestyle modification interventions for the management of diabetes among adults in the UK.

2. Prevalence of the Problem

One of the United Kingdom's healthcare challenges is diabetes when viewed as a long-term health. According to Diabetes UK (2025), the number of patients diagnosed is now at an all-time high of 4.6 million, with an additional 1.3 million patients diagnosed with type 2 diabetes, along with a further 6.3 million diagnosed with non-diabetic hyperglycaemia. Collectively, there are more than 12 million adults, which translates to one in five, who are affected by prediabetes, as indicated in Figure 1 (Diabetes UK, 2025). About 90% of diagnosed cases of diabetes are referred to as type 2 and are mainly connected with lifestyle-associated conditions, for instance, diet, lack of exercise (World Health Organisation, 2023), and excess weight. The burden of the disease is higher in South Asian communities, who are at excess risk by 5 times, and three times higher in Black African/Caribbean communities than the white British population (Patel et al., 2016; Zghebi et al., 2020; Office for National Statistics, 2023). The highest number of people with diabetes comes from the most deprived areas, as is highlighted in Figure 2. If left untreated, people with the condition run the risk of macrovascular or microvascular complications (Vaidya, Gangan and Sheehan, 2015). With that said, a systematic review of the evidence is considered to be reasonable and necessary since it offers an opportunity to change and manage the epidemic better through lifestyle.

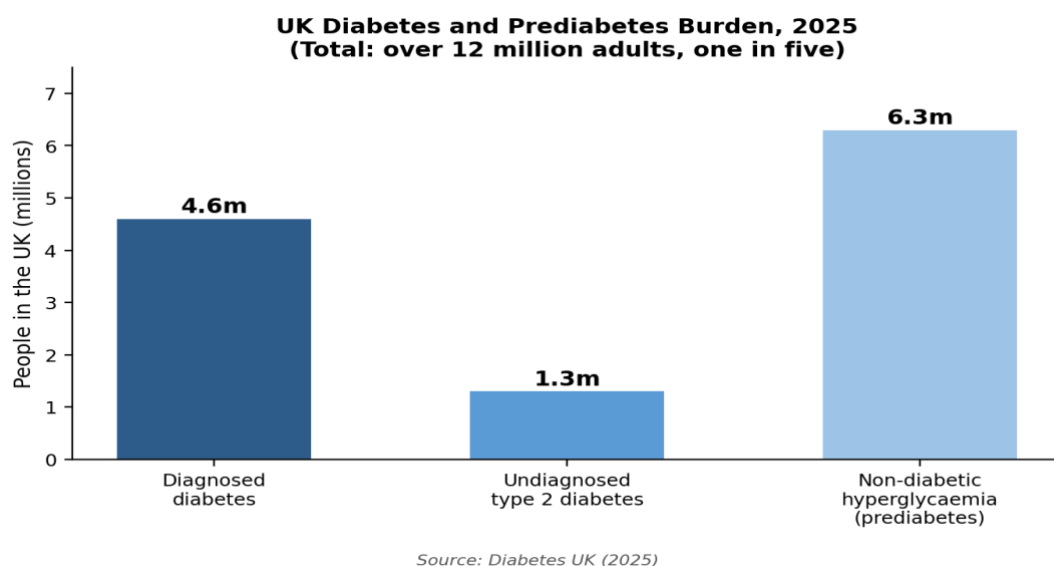
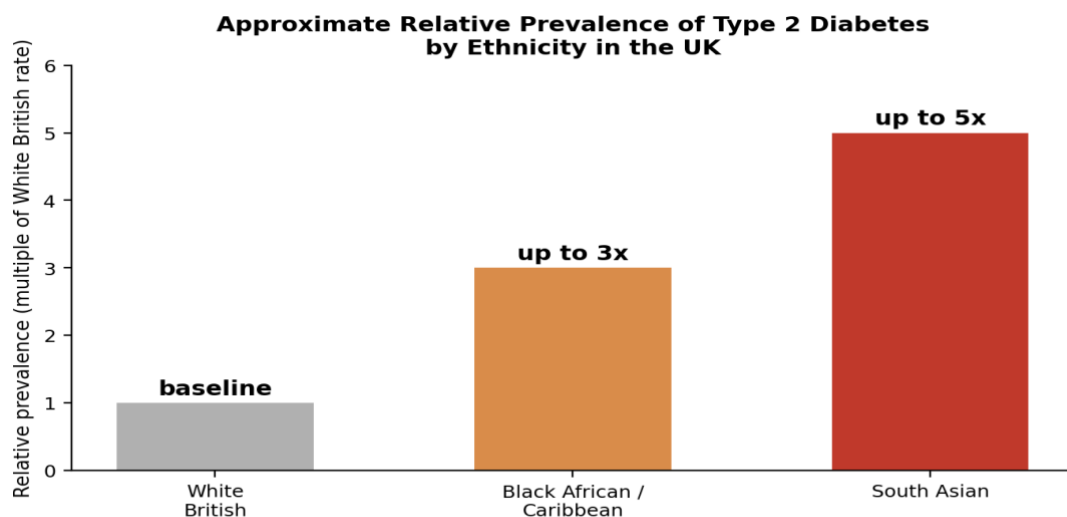


Figure 1: UK Diabetes and Prediabetes Burden, 2025 (Source: Diabetes UK, 2025)



Source: Patel et al. (2016); Zghebi et al. (2020) - illustrative multiples reported in the literature

Figure 2: Approximate Relative Prevalence of Type 2 Diabetes by Ethnicity in the UK (Source: Patel et al., 2016; Zghebi et al., 2020)

3. Introduction and Literature-Based Background

Type 2 diabetes results from a mixture of causes: insulin resistance along with a deterioration in the function of beta-cells within the pancreas (Tabak et al., 2012). It is also strongly correlated with being overweight, eating an unhealthy diet and being inactive. These possible causative factors can, in principle at least, be modified. Hence, lifestyle modification has become a major partner to drug therapy in diabetes management in national guidance and in much of the wider evidence base (National Institute for Health and Care Excellence, 2022).

Evidence is voluminous but far from settled for diet. An 18-study 2025 meta-analysis reported dietary interventions produced a modest but significant improvement in HbA1c (mean difference -0.30%, 95% CI -0.45 to -0.15) (Marume, Chidoko and Chirenda, 2025), though heterogeneous (I-squared 93.4%), where there is real dispute over which diet works best. The ketogenic diet was Jing et al (2023)'s pick for glycaemic control; earlier network meta-analyses of diabetes diets found low-carbohydrate strongest for HbA1c but Mediterranean strongest for fasting glucose, and the recent Yuan et al (2024)'s pick was Mediterranean followed by moderate-carbohydrate. One decade, three well-done network meta-analyses find three answers to which single diet is 'best', suggesting much of the apparent effect is due to outcome selection and trial length. Instead, perhaps the strongest of our closest evidence is in the same place; DiRECT. This cluster-randomised pilot primary care trial saw 46% of the intervention group achieve remission at twelve months (a structured low-calorie diet), compared with just 4% of controls (Lean et al., 2018). Crucially, the five-year extension of the study also indicated that, without sustained support, this benefit wanes, so remission was achieved in only around

a third who kept the weight down; thus, it is not correct to value the diet's performance over a single endpoint (Lean et al., 2024).

The same picture emerges from a walk over the grounds of the physical activity literature. Plotnikoff et al. (2013) showed that community-based physical activity interventions reduced HbA1c; that finding was cited a fair few times since. There is a more updated PRISMA-registered update (PROSPERO CRD420251111667) that does not find any effect at all on glycaemic parameters for blood pressure or lipids once more studies are pooled together, signifying that older meta-analyses and conclusions can actually be overturned, rather than fortified, by newer, bigger studies. Chua et al. (2024) showed a similar picture: wearable technology-based interventions were able to increase daily steps and bring some slight reduction in blood pressure with no change in HbA1c, and their certainty in the overall evidence was low. Change in activity pattern or eating habits does not translate into any measurable difference in any clinical outcomes. Changes in behavioural outcomes are not the same thing as changes in clinical ones, especially now that blood pressure, pulse, sugars and lipids in blood can be successfully addressed with medication: behaviour change has a high bar to clear now relative to its status thirty or fifty years ago to reduce something that now medicine can bring down effectively, for example.

A further element to discuss is inequalities in engagement, and this is where the paper argues hardest for a UK-specific review (Figure 2 above). In South Asian communities, engagement in physical activity was limited by practical barriers such as inadequate access to single-sex facilities and safety concerns in one study, rarely explored in the above trials as Patel et al. (2016) noted, even though diabetes risk was well known here. Similarly, in the study by Katangwe-Chigamba et al. (2024), the generic interventions being modelled on White British 'norms' of diet were experienced as an excluding factor, while culturally adapted interventions, using community Messengers, were found to be more able to sustain engagement, for example, compared to NHS pathways. If the trials underlying guidance are, for the most part, conducted among white majority populations, the research on which current guidance rests may not be generalizable to communities who suffer most strongly.

The literature suggests three things. Second, whether dietary or physical activity interventions perform better short-term on glycaemia control is not clear, but either one leads to short-term improvement. More importantly, how durable any improvement is not clear and may be overrated when outcome such as short-term HbA1c is used or understated behavioural measures such as step count are used to measure improvement due to lifestyle modification. Lastly, race/ethnicity of patients is rarely reviewed when ethnicity is the place interventions on the lifestyle are most warranted according to UK-based patients, despite being least

represented in the clinical trials the evidence is drawn from. Hence, currently there are no recent reviews that provides an appraisal of UK-based evidence with attention to race/ethnicity on improvement of glycaemia due to nutrition/dietary modification interventions and behavioural modification towards increased activity.

4. Rationale

Considering the scale of diabetes prevalence in the UK, the strong convincing evidence of how it relates to lifestyle and the fragmented nature of this review of evidence, a review to synthesize UK evidence could help clinicians, commissioners and policymakers to determine which are the most evidence-based approaches to modify lifestyle and help direct NHS resources towards treatments where there is evidence for clinical efficacy and appropriateness for the UK population.

5. Research Question

What is the effectiveness of lifestyle modification interventions in managing diabetes among adults in the UK?

6. Research Aim

To systematically review and evaluate the effectiveness of lifestyle modification interventions in the management of diabetes among adults in the UK.

7. Research Objectives

1. To identify and critically appraise existing studies on lifestyle modification interventions for diabetes management in UK adults.
2. To evaluate the effectiveness of dietary interventions on glycaemic control and related health outcomes.
3. To assess the impact of physical activity interventions on diabetes management outcomes.
4. To provide recommendations for future research and clinical practice.

8. Research Methodology

This proposal will involve a systematic review rather than conducting primary data collection (Petticrew and Roberts, 2006), because response to the research question requires comparison amongst the body of existing evidence; these results can be clearly presented by drawing together reports of clinical studies already completed. A post-positivist, evidence-based approach has been taken because HbA1c, BMI and other quantifiable outcomes are

reported in experimental and observational studies on patients with type 2 diabetes, which can be used to elicit objective conclusions. With the aim of transparency, this systematic review will adhere to the PRISMA 2020 statement, which consists of a 27-item checklist and flow diagram and to the Cochrane Handbook for Systematic Reviews of Interventions (Page et al., 2021) (Higgins et al., 2023). Work for the proposal is proposed to take place between Monday 28 September and Saturday 31 January 2027, by which point we assume that around 10 different studies will meet full screening criteria. These results will go on to inform the dissertation research conducted within Term 3, where the search criteria will be expanded following similar methodology.

9. Research Design

Population, Intervention, Comparator, Outcome (PICO) framework structures the eligibility and search criteria to begin the review. The Population will only include adults aged no less than 18 who are UK-resident adults who suffer from type one or two diabetes. Comparator/Intervention criteria will involve all the relevant lifestyle modification interventions. This would include dietary change, weight management, structured physical activity and some methods that include combination treatments. We will compare this area to that of the controls, including usual care and wait-list control. Outcomes will mainly involve two issues: the first being glycaemic control (glucose/HbA1c of the plasma) and changes as a result to body weight/BMI, other information such as remission or medication use will be studied as well as effects on health-related quality of life.

Diabetes terms (e.g. 'type 2 diabetes', 'diabetes mellitus') will be searched with lifestyle terms ('lifestyle intervention', 'lifestyle modification', 'diet', 'dietary intervention', 'physical activity', 'exercise', 'weight management', 'glycaemic control', 'HbA1c') and UK-specific terms using Boolean operators (AND/OR) and where available MeSH will be conducted. MEDLINE, Embase, CINAHL, PsycINFO and Cochrane CENTRAL will be searched, along with the hand searching of reference lists, grey literature publications, for example NICE and NHS England publications, will address the possibility of publication bias (Petticrew and Roberts, 2006).

Reference management software will be used to export and deduplicate the citations obtained from the databases. Titles and abstracts to be screened, with possible relevant full papers read in full and compared to the eligibility criteria. Study selection to be recorded by using the PRISMA 2020 flow diagram, showing the number of records identified and the number of articles that have been screened, appraised and included in the review, along with reasons for removing articles by reading the full text (Page et al., 2021). Any disagreement in screening between two separate screeners will be resolved during discussion meetings with the supervisor.

10. Recruitment, Sampling and Study Eligibility

This is a literature review, not a study that requires research participants. The 'sample' for this review is made up of studies that meet the eligibility criteria: Only peer-reviewed publications are eligible; publications must be within 10 years, to maintain relevance to current UK practice and demographics; only English language documents are included; the studies should take place entirely or partly in the UK; finally, the studies must explore adults (aged 18+) with type 1 or type 2 diabetes receiving and assessing a dietary, physical activity or nutritional advice intervention related to a glycaemic or weight-related outcome. Excluded are studies only involving pharmacological or nutritional treatment; they only cover gestational diabetes or explore paediatric populations or are not in UK settings and do not have an analysable UK element; or in the form of letters, memos, short reports, as only peer-reviewed publications will be considered. In cases where eligibility is not immediately clear from abstracts, publications could be further assessed against the criteria in full.

11. Materials, Data Collection Methods and Procedure

Data will be extracted using a standardised, pre-tested extraction form created using Microsoft Excel. Data on study characteristics (author; year; design; setting; source of funding; follow-up duration) and participant details (sample size; age; gender; ethnicity, mean baseline BMI and HbA1c) will be recorded. Details of the intervention and control groups (intervention (type, format, provider, location, number/frequency/duration of sessions and adherence and comparator conditions) which follow the TIDieR framework will be captured, as studies have shown such procedures reduce biases and enable more consistent interpretation of results (Higgins et al., 2023).

The methodological quality of included studies will be evaluated using the Critical Appraisal Skills Programme (CASP) checklist appropriate to the study design, i.e., the CASP Randomised Controlled Trial checklist for trials or the CASP Cohort Study checklist for cohort studies (Critical Appraisal Skills Programme, 2018). The quality appraisal results may be used in consideration, but not definitive exclusion of studies from the synthesis and for contextualising the strength of conclusions able to be drawn, with particular note of study limitations.

12. Proposed Data Analysis Technique

Due to heterogeneity of intervention types, outcome measures and study designs, a narrative synthesis will be the main method of analysis structured by the research aims (dietary

interventions, physical activity interventions and combined interventions). If multiple clinically or statistically homogeneous studies report similar outcome measures such as HbA1c change, random effects meta-analysis could be conducted, resulting in a pooled effect estimate using an approach employed in systematic reviews of diabetes prevention interventions [21-23] (Marume, Chidoko and Chirenda, 2025; Nyaga, Arbyn and Aerts, 2014). Heterogeneity will be assessed by I-squared statistics and results will be presented in a forest plot if appropriate using the PRISMA diagram. .

13. Ethical Considerations

Human participants' data are not being used for this study, i.e., it is a review of literature previously published, and no humans are being recruited or will be put at harm. Therefore, their informed consent is not directly required, and full ethical approval is not mandatory at this stage (Petticrew and Roberts, 2006). Despite this, some ethical issues are still applied and will be dealt with under the ethics guidance under university policy of PG2.

First, data protection and confidentiality are maintained by only working with anonymised data which has been published in peer-reviewed sources or reputable grey literature, so no personal data for identification purposes will be collected, stored or used (in line with UK GDPR). Second, academic integrity will be maintained by representing the results of included articles accurately (avoiding skewed or selective reporting of results) and fully and correctly identifying any sources we have used through referencing (Harvard system), to avoid plagiarism. Third, transparency and reproducibility will be upheld by specifying and adhering to PICO criteria and search strategy ahead of time before screening (documenting full PRISMA study selection process), which will reduce the probability of selectively including studies that would reinforce a preferred conclusion. Fourth, there is a risk of publication bias (studies showing positive results or which are statistically significant tend to get published), which we aim to reduce by considering the results presented in grey literature and searching unpublished trial registries (where accessible). In the discussion of the findings, we must note that publication bias may have occurred in the study. Lastly, all conflicts of interest presented in the study design and disclosed in included studies will be acknowledged when critically appraising studies and interpreting reported effect sizes.

An ethical approach will be described in full in my accompanying PG2 ethics application, which states that as the study is a secondary analysis of the literature, no NHS Research Ethics Committee approval would be required, since if the Health Research Authority Decision Tools are used, then research related to a literature review would not require NHS Research Ethics Committee approval.

14. Implications of the Research

Results are intended to shape clinical practice, shedding light on which lifestyle methods have the strongest support from UK-specific data and hence aid clinicians in refining their advice and referral routes. Likewise, the review may shape commissioning of lifestyle and weight-management schemes like the NHS Diabetes Prevention Programme and DiRECT-based schemes (Bower et al., 2023; Lean et al., 2018). At policy level, findings relating to ethnic disparities in engagement may encourage improvement to the cultural sensitivity of services akin to those found by Katangwe-Chigamba et al. (2024) Finally, gaps found will feed into the specific design and approach of the researcher's Term 3 dissertation.

15. Plan of Work and Time Schedule

The following schedule reflects the module timeline (Weeks 7 to 12), covering development of this proposal through to submission of the PG2 ethics form.

Task	Wk 7	Wk 8	Wk 9	Wk 10	Wk 11	Wk 12
Refine topic, revise background following poster feedback	X					
Systematic literature search (databases, grey literature)	X	X				
Screening, eligibility checking and PRISMA flow diagram		X	X			
Draft methodology, design and ethical considerations			X	X		
Full draft written and reviewed against supervisor feedback				X	X	
Final proposal submission (Turnitin)					X	
PG2 ethics form submission (Moodle)						X

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